Listing of Claims

This listing of claims will replace all prior versions and listings of claims in the application:

1. **(currently amended)** A method of determining the presence of a target analyte in a sample comprising:

a) acquiring a first data image of a random array composition comprising:

i) a substrate with a surface comprising discrete sites; and

ii) a population of microspheres comprising at least a first and a second subpopulation each comprising a bioactive agent;

wherein said microspheres are distributed on said surface such that each of said discrete sites contain no more than 1 microsphere;

b) storing said first data image in a computer readable memory to generate a first stored data image;

[[b)]]c) mapping a grid onto said first stored data image to create a registered first data image;

[[c)]] d) contacting said random array composition with said sample;

[[d)]] e) acquiring a second data image from said array with said sample;

~~e) mapping~~ f) storing said second data image in a computer readable memory to generate a second stored data image;

[[e)]]g) mapping a grid onto said second stored data image to create a registered second data image; and

[[f)]] h) comparing said first and said second registered data images in said computer readable memory to determine the presence or absence of said target analyte.

2. **(previously presented)** A method according to claim 1 wherein said discrete sites are wells.

3. **(previously presented)** A method according to claim 1 or 2 wherein said bioactive agents are proteins.

4. **(previously presented)** A method according to claim 1 or 2 wherein said bioactive agents are nucleic acids.

5. **(canceled)**

6. **(currently amended)** A method of signal pre-processing comprising:

a) acquiring a first data image of a random array composition comprising:

i) a substrate with a surface comprising discrete sites; and

ii) a population of microspheres comprising at least a first and a second subpopulation each comprising a bioactive agent;

wherein said microspheres are distributed on said surface such that said discrete sites contain microspheres; and

b) determining the similarity of a first signal from at least one discrete site to at least one reference signal, wherein said determining comprises obtaining said first signal from said at least one discrete site and comparing said first signal to a threshold similarity measure obtained by comparing a reference signal to a theoretical signal, wherein when said first signal is within said threshold similarity measure, said first discrete site contains a bead, wherein said first signal is derived from signals obtained by measuring a first signal in first and second channels, said reference signal is derived from signals obtained by measuring said reference signal in said first and second channels and the theoretical signal is the signal expected to be obtained from a first signal when measured in first and second channels when no bleed-through occurs.

7. **(original)** A method according to claim 6 wherein when said first signal is not within said threshold similarity measure, said first discrete site does not contain a bead.

8. **(original)** A method according to claim 7 wherein when said first signal is not within said threshold similarity measure, said first discrete site contains a defective bead.

9. **(original)** A method according to claim 7 or 8 further comprising disregarding said discrete site wherein said first signal is not within said threshold similarity measure.

10. **(previously presented)** A method according to claim 6 wherein when said first signal is within said threshold similarity measure, said first discrete site contains a bead that comprises an optical signature that is similar to said reference signal.

11. **(new)** A method of signal pre-processing comprising:

a) acquiring a reference signal from a first and a second subpopulation of discrete sites on an array, wherein said reference signal is derived from detecting a first signal in first and second channels;

b) determining a threshold similarity measure of said reference signal from said first and second discrete sites by determining the difference between said reference signal and a theoretical signal for each of said subpopulations;

c) acquiring a first signal from a each of a plurality of discrete sites on said array; and

d) determining if the first signal from each of said plurality of discrete sites is within the threshold similarity measure for the respective subpopulation of microspheres.

12. **(new)** A method of signal pre-processing comprising:

a) deriving first and second reference signals from first and second subpopulations of discrete sites on a substrate, said deriving comprising detecting a first signal from each of said first and second subpopulations in first and second channels;

b) determining the theoretical signal for said first signal, wherein said theoretical signal comprises the expected signal obtained from said first signal when measured in said first and second channels, when no bleed-through occurs;

c) determining a threshold similarity measure for said first signal, said determining comprising comparing said reference with said theoretical signal;

d) comparing a first signal from said first and second subpopulations with said threshold similarity measure, wherein said first signal is obtained by a method comprising detecting said first signal from said first and second channels. wherein when said when said first signal is within said threshold similarity measure, said first discrete site contains a positive signal.